

CLAIMS

1. A low dielectric constant film comprising a film comprising at least fine diamond particles and pores, wherein said low dielectric constant film comprises at least one metal selected from the group of metals whose carbonate salt or a sulfate salt has a solubility of 1 g/100 g or less at an ambient temperature.
2. The low dielectric constant film of claim 1, wherein said metal is at least one member of the group consisting of calcium, strontium, barium, mercury, silver, lead and radium.
3. A low dielectric constant film having at least fine diamond particles and pores, wherein said low dielectric constant film is treated with an aqueous solution of a salt of at least one metal selected from the group of metals whose carbonate salt or sulfate salt has a solubility of 1 g/100 g or less at an ambient temperature.
4. The low dielectric constant film of claim 3, which is treated with an aqueous solution of a salt of at least one metal of the group consisting of calcium, strontium, barium, mercury, silver, lead and radium.
5. An electronic part comprising a low dielectric constant film according to any one of claims 1 to 4 as at least one constituent element.
6. A low dielectric constant film comprising a film comprising at least fine diamond particles and pores, wherein the surface of said fine diamond particles has a group of a general formula of $-X$ group which is more hydrophobic than hydroxyl group instead of hydroxyl group.
7. The low dielectric constant film of claim 1, wherein X in said general formula of $-X$ group is at least one member selected from the group consisting of hydrogen, fluorine, C_1 to C_4 alkoxy group, phenoxy group, o -(m - or p -)alkylphenoxy group (in which alkyl group is C_1 to C_4 alkyl group), $OCOR$, $OCONRR'$, $OSiR_3$ [in which R

and R' each represents hydrogen, C₁ to C₄ alkyl group, phenyl group or o-(m- or p-)alkylphenyl group].

8. The low dielectric constant film of claim 1 or 2, wherein X in the general formula of -X group is OSiR₃ (where R is C₁ to C₄ alkyl group).

9. An electronic part containing said dielectric constant film of any one of claims 1 to 3 as at least one constituent element.

10. A method of manufacturing a low dielectric constant film, said method comprising the step of reacting active hydroxyl groups on the surface of fine diamond particles and a hydrophobic agent.

11. The method of manufacturing a low dielectric constant film of claim 5, wherein said hydrophobic agent is at least one member selected from the group consisting of hexaalkyl disilazane, trialkyl monohalogen silane, triphenyl monohalogen silane, arylated alkyl monohalogen silane, dialkyl dihalogen silane, trialkyl monomethoxy silane, triphenyl monomethoxy silane, arylated monoalkoxy alkyl silane, dialkyl dimethoxy silane and diazoalkylene.

12. A low dielectric constant film comprising a film comprising at least fine diamond particles and pores, wherein the surface of said fine diamond particles is treated with at least one single substance of the following (a) or a mixture of substances of at least one of (a) and at least one of (b) as described below:

(a) a substance represented by the general formula:



(b) a substance represented by the general formula:



(where n = 1 or 2, m = an integer of 0 to 3, X represents a halogen group, C₁ to C₆ alkoxy group or phenoxy group, and R represents C₁ to C₆ alkyl group).

13. The low dielectric constant film of claim 1, wherein X is at least one member selected from the group consisting of chlorine group, methoxy group and ethoxy group and R represents methyl group or ethyl group in the general formula (a) and the general formula (b).

14. The low dielectric constant film of claim 1 or 2, wherein m is 1 in the general formula (a) and the general formula (b).

15. The low dielectric constant film of any one of claims 1 to 3, wherein n is 1 in the general formula (a).

16. The low dielectric constant film of claim 1, wherein said substance of the general formula (a) is at least one member selected from the group consisting of dichloro tetramethyl disiloxane, dimethoxy tetramethyl disiloxane, tetrachloro dimethyl disiloxane and tetramethoxy dimethyl disiloxane, and said substance of the general formula (b) is at least one member selected from the group consisting of hexachlorodisiloxane, hexamethoxy disiloxane and hexaethoxy disiloxane.

17. A low dielectric constant film comprising a film comprising at least fine diamond particles and pores, wherein the surface of said fine diamond particles is treated with at least one member of the general formula (b) in which X represents a C₁ to C₆ alkoxy group or phenoxy group.

18. An electronic part comprising the low dielectric constant film of any one of claims 1 to 6 as at least one constituent element.

19. A method of manufacturing a low dielectric constant film, said method comprising the step of chemically reacting hydroxyl groups on the surface of fine diamond particles and at least one single substance of (a) or a mixed substances of at least one of (a) and at least one of (b) described above.

20. The method of manufacturing a low dielectric constant film of claim 8, wherein said substance of the general formula (a) is at least one member selected from

the group consisting of dichloro tetramethyl disiloxane, dimethoxy tetramethyl disiloxane, tetrachloro dimethyl disiloxane and tetramethoxy dimethyl disiloxane, and therein said substance of the general formula (b) is at least one member selected from the group consisting of hexachlordisiloxane, hexamethoxy disiloxane and hexaethoxy disiloxane.